

ABSTRACT OF THE INVENTION

A method and a device are disclosed for monitoring the synthesis of proteins by the ribosome in real time, *in vivo* as well as in *in-vitro*. The ribosome is engineered to carry a donor fluorophore, and tRNA and/or amino acids and/or some other part of the ribosome are either engineered to carry acceptor fluorophores or else their natural fluorescent properties are utilized as acceptors. As the ribosomes mechanism processed the mRNA and tRNA molecules and synthesizes a polypeptide chain, a light source illuminates the ribosome, exciting the donor fluorophores and thereby the acceptor fluorophores whenever these are in sufficient proximity to a donor. The resulting signals are detected and used as a key for real-time database searching and identification of the protein being synthesized. The resulting data can be tabulated and interpreted in different ways. Figure (1) describes the properties of a FRET pair and the dependence of FRET on pair distance.